

Executive Summary

If countries have policy, regulatory, and institutional frameworks in place to support science and technology, they can increase agricultural productivity and stimulate economic growth.

Advances in science and technology contributed to substantial gains in global agricultural productivity in the 20th century. Not all regions benefited equally, however, and it remains a challenge in the 21st century to ensure that all countries have access to innovations and discoveries that could raise incomes, reduce hunger, and improve nutrition. If countries have policy, regulatory, and institutional frameworks in place to support science and technology, they can increase agricultural productivity and stimulate economic growth. Thus, chronic hunger would be reduced, and opportunities to participate in global markets would increase.

Agricultural production technologies and practices have been developed to improve soil, water, nutrient, and pest management. Crop improvements contributed to the successes of the Green Revolution. Modern biotechnology tools have been used to achieve higher levels of stability and sustainability in crop production. These innovations have increased yields and reduced environmental impacts. Advances in animal breeding and health have increased both the quantity and quality of animal protein available to consumers.

Improvements in marketing, processing, and transportation technologies have expanded the choices of food that are readily available to consumers. These innovations can be adapted to preserve and deliver vitamin-rich foods to help combat nutrient deficiencies in all countries. In addition, technologies to reduce food safety hazards can be used to increase the health of both rural and urban populations.

Scientific and technological advances in the 21st century will result from research investments in both traditional agricultural fields and other emerging disciplines. Agricultural production research will be targeted to develop crops and animals that can tolerate a wider range of environmental conditions and offer consumers desired characteristics. Molecular methods will be used to diagnose diseases, locate pollutants in the environment, and detect harmful micro-organisms in food. Modern biotechnology holds promise for

the production of pharmaceutical compounds such as vaccines within locally grown plants. Innovations in biological and information sciences have resulted in several emerging fields that hold promise for the development of future agricultural technologies. The new fields of bioremediation, nanotechnology, genomics, and bioinformatics will increase knowledge that can be shared and used to improve sustainable agricultural production and protect ecosystem functions in developed and developing countries alike.

These advances hold great promise, but the full benefits of scientific breakthroughs will not be realized without the dissemination and adoption of new technologies. In each country, the successful local development of technologies or the transfer and adaptation of innovations from others will depend on incentives and barriers faced by investors and producers. Countries with strong research, health, and education capacity will offer a supportive environment for technology development and investment.

Countries have many crucial decisions to make in meeting their sustainable agricultural goals. These decisions need to be made and implemented based on decisionmakers' knowledge of their countries' unique environmental, social, and economic characteristics. There are many ways that developed countries, international institutions, and businesses can increase the possibilities for all countries to benefit from scientific and technological advances.

